Minutes of T11 HIPPI SWG, and HNF - Technical Committee (TC)
June 9-10, 1997
Seattle, Washington

1. Opening remarks and introductions

The Chairman, Don Tolmie of Los Alamos National Laboratory, opened this HIPPI meeting and thanked Mike Foster and Boeing Defense & Space Group for hosting this meeting. This group is constituted as both the HIPPI special working group (SWG) under T11, and the HIPPI Networking Forum (HNF) - Technical Committee (TC).

Don lead a round of introductions. The list of attendees is at the end of these minutes.

2. Review / modify the draft agenda

Draft agendas were distributed via e-mail before the meeting and hard copies were distributed at the meeting. No changes or additions were suggested. These minutes reflect the approved agenda, although not in the exact order they were covered.

Don Tolmie introduced Tina Pan, a graduate student working a Los Alamos for a few months. Tina will be helping Don with the meeting minutes and standards documents. Don also solicited meeting notes from other attendees as an aid for producing accurate minutes. *(Thanks to Roger Ronald, Ron Nikel, and Tina Pan for providing their meeting notes, which helped make these minutes more complete and correct.)*

3. Review minutes

3.1 May 13-15, Mountain View, meeting

The minutes of the interim HIPPI meeting of May 13-15, 1997, in Mountain View were reviewed.

Joe Parker moved, and Roger Ronald seconded, to approve these minutes as corrected. Passed unanimously.

4. Review old action items

The action items from the May 13-15 1997, meeting were reviewed for the current status.

1. Michael McGowen to suggest to HNF that if they desire a name change for the public name of HIPPI-6400 that they come up with suggestions. (Done)
2. Michael McGowen to send an electronic copy of their HIPPI-800 End-Point MIB to Tolmie for posting on the web. (Done)
3. Everyone to review the HIPPI-800 Switch MIB and pass comments to Marck Doppke. (Carryover)
4. Michael McGowen to coordinate the HIPPI MIB developers. (Carryover)
5. Von Welch to contact HIPPI-6400 MIB users and developers for comments on the current draft, and to prepare a presentation on the MIB for a future meeting. (Carryover)
6. Everyone to review the HIPPI-6400 MIB. (Carryover)
7. Kevin Lahey, Jeff Young, Jean-Michel Pittet, and Greg Chesson to begin an IP and ARP over HIPPI-6400 RFC. (In process)
8. Michael McGowen to pursue having Phil Cameron look at ARP for HIPPI-800. (Carryover)
9. Greg Chesson to contact Bob Snively of Sun about material and format for an IEEE tutorial on HIPPI-6400 ULA usage, and the ULAs special to HIPPI-6400. (Carryover)
10. Michael McGowen - Update HIPPI-AC to work with HIPPI-SC and its recent changes. (Carryover)
11. Everyone to suggest changes to HIPPI-FP and bring in proposals for them. (Carryover)
12. Don Tolmie to revise HIPPI-FP, X3.210-1992, with the ULP-id for HIPPI-6400 encapsulation and get the HIPPI-FP document ready to forward. (Carryover)
13. Greg Chesson and Jeffrey Chung to consider developing "reason codes" to explain why a particular HIPPI-ST Operation was rejected. (Carryover)
14. Greg Chesson to do a first draft of HIPPI-ST over Ethernet. (Carryover)

15. James Hoffman to lead the e-mail discussion of intermediate devices setting Block size limits. (Done)
16. Jim Pinkerton to resolve the use of R_id, S_id, B_id and their use in Request_To_Receive. (Carryover)
17. Chris Satterlee to notify the HIPPI community by e-mail that the Concatenate and Source_Concatenate features were planned to be removed from HIPPI-ST. (Done)
18. Francois Gaullier to develop the basics of a mapping of HIPPI-ST over ATM. (Done)
19. Don Tolmie to update HIPPI-ST Rev 0.6 with the changes agreed to at the May meeting. (Done)

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20. Greg Chesson to supply Don Tolmie and Roger Ronald with the layout of the OUI bits. (Carryover)
21. Roger Ronald to investigate specifying using either full 48-bit ULA addressing, or a subset selected by the "locally administered" bit, and provide appropriate text for HIPPI-6400-SC. (Done)
22. Roger Ronald and Craig Davidson to include the address mapping between HIPPI-800 and HIPPI-6400 in future revisions of HIPPI-6400-SC. (Carryover)
23. Don Tolmie to have an ANSI Style Manual sent to Roger Ronald. (Carryover)
24. Roger Ronald to update HIPPI-6400-SC Rev 1.1 with the changes agreed to at the May meeting. (Done)

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25. Hansel Collins to draft text to replace -PH table 8, which gave the values for the cable coupling network. (Done)
26. Hansel Collins to finish the cable driver test jig, test cable system, and determine the Source driver's output impedance. (Carryover)
27. John Ellis to determine the smallest wire (largest gauge) that can successfully be used with the Berg connector. (Done, i.e. 32 AWG)
28. John Ellis to investigate cable testing costs and complexities if the total equalizer network is in the backshell, including the series capacitor. (Done - it is possible and not a major cost)
29. Everyone to investigate the cable termination problems and be ready to make decisions at the June meeting. (Done)
30. Hansel Collins and Steve Joiner to determine the values to replace the 'TBDs' in the copper clauses of HIPPI-6400-PH. (In process)
31. Hansel Collins and Steve Joiner to draft definitions of pulse width distortion and jitter for use in HIPPI-6400-PH. (In process)
32. Hansel Collins to provide an eye mask diagram for the copper cable variant. (Carryover)
33. Ron Nikel to look at the stub reflection if the equalizer is on the board and a series resistor is in the backshell of a short cable. (Done)
34. Robert Clarkson to review the revised connector layout for correctness. (Done - OK)
35. Michael McGowen to collect and tabulate everyone's requirements for HIPPI-800 and HIPPI-6400 translation environments. (Carryover)
36. Don Tolmie to update HIPPI-6400-PH Rev 1.3 with the changes agreed to at the May meeting. (Done)

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37. Hansel Collins, Steve Joiner, and Dan Schwartz to come up with a pulse width distortion number for HIPPI-6400-PH table 9, or something equivalent, e.g., jitter. (In process)
38. Don Tolmie to do an initial draft of HIPPI-6400-OPT. (Carryover)
39. Dan Brown to write the first draft of the optical portion of the HIPPI-6400-OPT document. (Done)
40. Don Tolmie to make Dan Brown's optical draft available on the HIPPI web page. (Done)

5. HIPPI-6400-PH

5.1 Copper cable interface

Ron Nickels volunteered to provide detailed notes on this discussion.

Before reviewing the changes to HIPPI-6400-PH, Ron Nikel and Hansel Collins went over the findings at SGI. Bill McCoy of E-Systems and Herb Van Deusen of Gore confirmed the findings with their own simulations. Ron discovered that their preliminary calculations on resistor and capacitance values may be incorrect. He suggested that they the group use one set of measurements and one simulator to avoid finger pointing. Herb is to do the PSPICE simulations, and Bill will be the focal point for the simulations.

The location of the equalizer was discussed. The SGI guys did not find any differences in their results when it was moved from the board to the backshell. Bill and Herb did, and Don Tolmie said that Gene Dornhoff had seen problems in his simulations at Los Alamos.

Ron Nikel showed a piece of scope probe cable that he said would work for short HIPPI-6400 cables. This cable, from Precision Interconnect had a 40-AWG nichrome center conductor. Herb said that similar cable is also available from Gore. John Ellis had previously stated that the Berg connector would support wire as small as 32-AWG, so 40-AWG wire may create an assembly problem. The number of short cables may be small, and we can probably afford special assembly. It was felt that we had to get at least one cable to work before spending too much energy on special cables. We still have a large disconnect between the different simulations and their interpretations.

A suggestion to have the experts get together in one location for several days to resolve the problem did not pan out – Herb is in New Jersey, Bill is in Austin, Hansel and Ron are in Mountain View, and Gene is in Los Alamos. The best bet may be to continue refining the equalizer with simulations and then test with actual SuMAC chips and cable when the SuMAC is available (late September?).

Herb felt that now that the parameters are firming up that it was worth another look at the Gore Eye-Opener Plus cable that did not require a discrete equalizer network. Herb will continue this work. John Ellis stated that testing a cable with a blocking capacitor in the backshell would not be impossible or prohibitively expensive; it will just take some special techniques.

The following items were agreed to at this meeting:

- PSPICE will be the modeling tool for all electrical models
- All modeling results will be based on the previously agreed on topology and the Gore cable model
- Herb Van Deusen of Gore to implement all test structures in a measurement board to verify model results
- Submit possible signal topologies to Gore for implementation in a test structure
- SGI will continue to work on the equalizer design for the full range of cable solutions
- All measurements to be done at the receiver pad in both simulation and lab measurement data
- Bill McCoy E-Systems to submit the worst case Widmer pattern that he is using

By the July meeting in Minneapolis we plan to:

- Have one analytical approach
- Have timing values solidified
- Hansel to work on jitter values
- Herb, Ron, Hansel, and Bill to keep working until we have at least one model working completely
- Herb to investigate Eye-Opener cable, and determine distances and parameters
- Pursue small/resistive wires

By Honolulu in August we should have one proposed solution and be ready to test with the SuMAC chip.

During review of HIPPI-6400-PH Rev 1.4, tables 13 and 14 had the T_{PWD} and T_{JITTER} values removed. These will be added to table 12, with separate entries for each of the signals.

John Ellis noted some changes to the connector dimensions. In figure 26, A15 changes from "8.130 mm / 0.320 inches" to "8.870 mm / 0.349 inches". In figure 27, B1 changes from "96.28 mm / 3.80 inches" to 96.5 mm / 3.80 inches", and B9 changes from "10.77 mm /0.42 inches" to "9.99 mm / 0.39 inches".

5.2 Local electrical interface

The changes to clause 15 were reviewed, and we went over them again with the optical folks (see item 10.8).

Based on the changes made to Tables 12, 13, and 14, Hansel and Ron redid Table 8 and presented it when we had the optical folks present. No changes were made to the revised table during the optical discussions.

5.3 Review other changes from Rev 1.3 to Rev 1.4

The changes in the other clauses in this June 2 revision were reviewed. Only the contentious issues that generated a lot of discussion are reported here, otherwise you can assume that the marked changes were accepted pretty much as written.

5.4 Service interface

The term ULP was changed to "next_layer", and people seemed to like the change. Many editorial changes were made. In the 64_TRANSFER.Indicate it was noted that the data overrun and underrun errors were *optionally* reported to the next-layer. We reworded much of the text for clarification.

5.5 Plans for forwarding

Don Tolmie outlined the steps in the standards approval process, and where the HIPPI folks can have input without slowing the process down. Our goal for HIPPI-6400-PH was to forward it to T11 at the August plenary. This would result in us getting the T11 comments in October, and hopefully having them resolved and a new document to T11 for the December plenary. Don volunteered to draft the letter ballot responses.

Our first priority is to get copper working. The first SuMAC chips will be available in September. With a little testing time, and hopefully few disasters, we now plan to forward at the October plenary. We will try to resolve all of the letter ballot issues during the T11 letter ballot, and hopefully avoid any technical comments during the first public review. Without public review comments, we can avoid a second public review and about a six-month hit.

6. HIPPI-6400-SC

6.1 Review changes from Rev 1.1 to 1.2

Roger Ronald led the discussion on -SC since he is the technical editor. Like for 6400-PH, only the contentious issues are reported here, otherwise you can assume that the changes marked in Rev 1.2, dated June 2, 1997, were accepted pretty much as written.

A needed change to the document, discovered prior to the meeting, was the re-assignment of two flag bits to their definition held prior to this revision. Tom Gilbert of Harris had pointed out that the two uses were essentially redundant (true). However, this had not stopped the SuMAC from using them, and Dave Perry of SGI wanted them back. Roger announced at the meeting that they would be restored and there was no dissent.

Roger added a section comparing 48-bit addressing versus less than 48-bit addressing, and this was the sole area of controversy for the document. Jeff Young of Cray did not like the initial wording and Roger was able to reword this during other parts of the meeting; the revised text met with accepted by the group.

Craig Davidson grumbled about the state required to implement one of the broadcast requirements (where the switch notifies the broadcast server of a state change in the list of broadcast recipients). Roger was willing to be persuaded to use other methods if any proved satisfactory. None did. Instead, Roger was requested to show how an implementation could easily be done with the present requirements; he will include this in the next revision.

Major changes to 5.2.2 on Destination ULA Processing. Renamed Full Destination ULA Processing. Finally decided on a wording to describe this section, but Roger is free to change it again before July.

Roger will go over Table 8 and verify that the text matches the commands.

Discussed removing Multicast from section 9 Broadcast / Multicast. Multicasting is not always used and it is cumbersome to read.

6.2 Plans for forwarding

We have been working towards forwarding HIPPI-6400-SC at the same time we forward HIPPI-6400-PH, i.e., October, 1997.

7. HIPPI-ST

7.1 Review changes from Rev 0.6 → Rev 0.7

The changes in this June 5, 1997 revision were reviewed. Only the major and contentious issues that generated a lot of discussion are reported here, otherwise you can assume that the changes marked in the document were accepted pretty much as written.

When removing the Concatenate and Source_Concatenate features Don had missed some places in the document that talked about 64-bit addresses – these will be removed in the next revision. A global replacement of S_count to S_num was also missed, and will be added. Figure 5 still needs a revision, and Tina Pan will fix it.

In section 4.3.1 a note about how ST addresses are generated and passed will be added.

With the removal of the Concatenate and Source_Concatenate flags, it was decided to move the two Reserved flags to the higher order bits to allow more flexibility in the future. Hence, Out_of_Order, Silent, Interrupt, and Send_State all move down two bits in figure 9.

An open issue of addressing parameters was discussed. It needs to be included or referenced in some manner in this document. Don will add it and it will be reviewed at the next meeting.

In Annex B, ULA was replaced by source physical address to be more general.

The waffles in Figures B.1-3 are switches. They will be converted to clouds to avoid confusion. The three figures will be drawn consistently.

7.2 ATM as the lower layer

Robert Hyerle of Hewlett Packard proposed HIPPI-STORM (HIPPI-ST over ATM). During the discussion the lack of direction in -ST about where address information is generated and how it is passed to the lower layers was uncovered. Don will try to add some text clarifying it in the next revision. HIPPI-ST over ATM would use AAL5 with 32K byte packets. For ATM, Robert proposed using the 2-byte LAN Emulation header ahead of the HIPPI-6400-PH MAC header and HIPPI-ST header. The 2-byte LANE header would be added and stripped at the edge devices. LANE exists and works, but may eventually be superceded by MPOA (Multiple Protocol over ATM). Robert provided an electronic copy of his slides, which Don will make available on the web site.

7.3 Review changes in Annex C examples

Annex C in Rev 0.7 is still pretty rough; it has been edited extensively but is recognized as not being complete. Tina Pan is taking over as the main editor for this part of the document, and she led the discussion on the changes to date.

One of the Data Operations must be written out completely before having the table of different data operations on p. 37.

Example 1 will be simplified. Instead of pulling two buffers at a time, the STU size will change from 16-bit to 32-bit. This change will affect some of the commands and figures that follow.

Everyone would like to have consistent formatting of each command; following the format in the rest of the document.

8. IEEE related items

8.1 Tutorial for HIPPI-6400 ULA use

Fred Templin of NASA Ames originally took an action item to work on an IEEE Tutorial for HIPPI-6400 ULA use. With Fred leaving the committee, Greg Chesson volunteered to carry this work forward. Greg reported that it is in process and should be ready by August.

8.2 HNF's OID assignment for ULAs

The HNF has asked IEEE for an organization code that we can use with HIPPI-6400 implementations. Dru Popper-Lopez stated that the assignment should be coming through shortly. Once obtained, it will be recorded in the HIPPI-6400-SC document. The IEEE responded that they wanted to make sure that we didn't want a 64-bit EUI assignment rather than the 48-bit OUI. *(See the note right before the attendance at the end of these minutes.)*

9. IETF related items

9.1 IP over HIPPI, RFC 1374

John Renwick of Ascend recently reported via e-mail that "IP over HIPPI" has been assigned RFC 2067, obsoleting RFC 1374. John is the contact, at jkr@netstar.com. We had previously thought we were done with this document, but Jes Sorensen of CERN pointed out a small error to John. John reports that this will be fixed in the next revision.

9.2 ARP over HIPPI-800

Our previous ARP stuff for HIPPI-800, i.e., RFC 1374, was dropped by the IETF due to lack of sufficient implementations. Michael McGowen took an action item to see if Phil Cameron could do some work on ARP for HIPPI-800. It may be possible to

leverage some of the HIPPI-6400 ARP work. Marck says the investigation is on-going.

Jean-Michel Pittet from SGI is also working on this project. It is desirable to have a common IP for both HIPPI-800 and HIPPI-6400. Greg Chesson took an action item to put Jean-Michel Pittet in touch with Phil Cameron of Essential Communications.

An action item was given to Greg Chesson and Robert Hyerle to get Jean-Michel Pittet and Dennis Roger to start working together on ARP over HIPPI-800.

9.3 HIPPI end-point MIB

Mark Kelley had said that he will start working on the end-point MIB again. Mark was not at this meeting, and nothing new was reported.

9.4 HIPPI switch MIB

HIPPI Switch MIB, version 1.0, developed by Marck Doppke of Essential Communications, has been available on the HIPPI web page for some time. Marck would like feedback from the group before testing. Right now, the MIB is only for HIPPI-800 switches, but people would like it for HIPPI-6400 as well. Other names that were mentioned as working on HIPPI MIBs were Von Welch of NCSA, and John Betkovseky and David Walker of Raytheon E-Systems.

Don took an action item to make Marck's MIB document available in PDF format on the web.

9.5 HIPPI-6400 MIB

Von Welch's "HIPPI 6400 End Point MIB" rev 0.3, based on HIPPI-6400-PH 0.9, had been available through the HIPPI Standards web page for some time. Von was not at this meeting, and nothing new was reported.

Michael McGowen has an action item to try to coordinate the MIB developers and try for commonality.

9.6 HIPPI-6400 ARP and IP RFC

Kevin Lahey, Jeff Young, Jean-Michel Pittet, and Greg Chesson have an action item to develop an RFC for HIPPI-6400 ARP and IP. Greg Chesson reported that Jean-Michele Pittet of SGI will be the person doing the actual writing, and the work is underway. At this time ARP and IP will probably be in the same document. A separate document for IP over HIPPI-ST may also be developed, or the information may be made part of the HIPPI-ST document.

10. HIPPI-800 topics

Marck Doppke brought up needing an "Introduction to HIPPI-800" for technicians and other HIPPI novices. HNF may be willing to fund it. This would be an introductory manual including: how to produce an I-Field, how to set up the equipment, training etc. Contact Dru Popper-Lopez if interested. Chris Olsen said that he has something started, and will work on finishing his document.

10.1 Publication of finished ANSI Standards

Don Tolmie reported that HIPPI-Serial, HIPPI-ATM, HIPPI-SC Revised have all completed their processing and became approved ANSI standards in March 1997. HIPPI-Serial and HIPPI-ATM have been published by ANSI, and HIPPI-SC should be published soon.

Don reported that he was quite upset with the ANSI editors for publishing the HIPPI-Serial document in single-column format rather than the double-column format that he supplied to them. He felt, and the committee agreed, that double-column is easier to read, and more professional looking. ANSI said that it was less work for them to publish in single-column format. ANSI is aware of our displeasure, and have flags out so that any future documents for HIPPI, or from Tolmie, will get special treatment.

10.2 HIPPI-AC (Auto Configuration)

Interest had been expressed in this document some time ago, but no progress has been made for over a year. It was agreed that if no progress is made by the October meeting then we will kill the project. Don took an action item to notify Michael McGowen and the e-mail reflector of our intentions.

10.3 HIPPI API

Nothing new for this meeting. Currently we have SGI's character driver API (user level), and HP's device driver level API. SGI is also now doing a sockets level API for HIPPI-ST. Things are still cloudy, but in process.

10.4 HIPPI-MP

At the April 1997 meeting we voted to kill this project since striping can now be accomplished with HIPPI-ST. T11 approved this action at their April Plenary. Roger Cummings, T11 Chairman, has written to the X3 Secretariat requesting withdraw of project 1214-D for HIPPI-MP.

10.5 HIPPI-FP

We now have approved Project 702-R to revise HIPPI-FP. The original intent was to include a new ULP-id for HIPPI-MP (which is no longer needed). The change to add ULP-id = x'0C' for HIPPI-6400 encapsulation is a trivial change, and so far has been the only change requested for the document. Don will also include as changes the editorial comments from the ANSI and ISO editors. It was agreed that we should forward the revised HIPPI-FP when we also forward HIPPI-6400-PH and HIPPI-6400-SC documents.

11. HIPPI-6400-OPT (Optical)

11.1 Introductions

Since many new faces were added to the group for this portion of the agenda, a round of introductions was made. The attendees at this portion of the meeting are not singled out in the attendance list attached to these minutes.

11.2 Selection of Secretary

Michael Griffin volunteered to take notes for this portion of the meeting.

11.3 Review / Modify draft agenda

Presentations from Dan Schwartz of Motorola on Open Fiber Control, and Steve Joiner of HP concerning Jitter were added to the proposed meeting agenda. The agenda was accepted without further modifications.

11.4 Review optical portion of April minutes

Item 6 of the April 7-8, 1997, Palm Springs, CA, HIPPI minutes were reviewed. A previous correction by Dan Schwartz, and some errors in the attendance list, had already been included. Steve Joiner requested that “vastly” be removed from the second paragraph of 6.3. With these changes the minutes were approved. Don Tolmie will update the April minutes and put a clean copy on the web page.

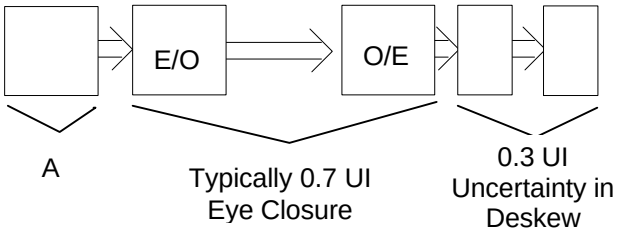
11.5 Review of old action items

The action items pertaining to optical were reviewed:

38. Don Tolmie to update the draft HIPPI-6400-OPT Project Proposal and get it in the T11 June mailing. (Done)
39. Hansel Collins, Steve Joiner, and Dan Schwartz to come up with a pulse width distortion number for HIPPI-6400-PH table 9, or something equivalent, e.g., jitter. (Done)
40. Don Tolmie to do an initial draft of HIPPI-6400-OPT. (Carryover)
41. Dan Brown to write the first draft of the optical portion of the HIPPI-6400-OPT document. (Done)
42. Don Tolmie to make Dan Brown's optical draft available on the HIPPI web page. (Done)

11.6 Jitter discussion

Steve Joiner of Hewlett-Packard used the following figure to talk about the optical jitter problem.



The key problem is that the typical summation of the normalized jitter factors results in a number greater than one. Steve, and Hansel Collins, suggested that this effect can be reduced via filtering and cleaning the clock signal at the receiver, e.g., with a SAW filter, prior to de-skewing, The next challenge is to verify that the remaining jitter factors sum to a value less than one. Hansel pointed out that the SuMAC skew compensation circuitry essentially used a tapped delay line to adjust the skew value. Hence, there are discrete points where the received signal can be sampled, not the continuous range offered by most clock recovery schemes.

A number of questions followed:

- A question about the effect of fiber length on system jitter was answered by Joiner; stating that it depended on how close the received power level was to the receiver noise floor.

- Clock filtering can be accomplished by Surface Acoustic Wave filters, but some PLL implementations should also work, according to Joiner. It is possible that clock filtering could obviate the need for the use of the CLOCK_2 signal, but this has not been explored.

- A discussion ensued about the periodicity of the HIPPI-6400 re-training sequence and PLL implementations. Greg Chesson and Steve Joiner agreed it is possible to let PLLs periodically drift without dire consequences. The worst case run length during retraining is 18 low / 14 high according to Hansel Collins and Greg Chesson.

- Steve Joiner and Hansel Collins were thanked by the HIPPI-6400 Optical committee for making good progress on a number of these Jitter issues.

11.7 Electrical I/O specification

Review of what was in pages 33-36 (15 Local electrical interface) of HIPPI-6400-PH Rev 1.4 followed.

Table 8 was modified to replace Clock Duty Cycle tolerance, Baud Period tolerance, and Frame Period tolerance with the appropriate values for T_{PWD} and T_{Jitter} for each.

In Table 9, the TX V_{out} (max) parameter does not represent a SuMAC reality. Hansel Collins will help define a proper value. Rise and Fall times for the transmitter were adjusted to 250 ps, max. The F_{in} parameter was restated in Mbaud instead of frequency. T_{PWD} and T_{jitter} were removed from Table 9.

Table 10 describes the electrical receiver specifications. T_{PWD} and T_{jitter} were removed here as well. After a discussion by Siemens and other attendees about receiver rise and fall times, there was a general consensus to specify the maximum T_{Rise} and T_{Fall} at 400 ps. Finally, the Imbalance and T_{PWD} and T_{Jitter} parameters were removed from Table 10.

11.8 Optical link specification

Revision 1.0 of the optical I/O specification, primarily in table form, was provided by Dan Brown of AMP.

- The Data Rate units in the table were changed to "Mbit/s" from Mbaud.

- The Bit Error Ratio had the descriptor "max." removed and the value was labeled "$\leq 10^{-12}$".

- A discussion of the extinction ratio specification was highlighted by comments from Dan Brown of AMP, Ali Ghiasi of Sun, and Kurt Aretz of Siemens. The comments focused on unique method of defining an amplitude, instead of a ratio. This was done to accommodate the variable extinction ratio scheme proposed by Vixel at the April meeting. ***The proper extinction ratio specification is an open issue.***

- Eye Opening was added to the receiver part of this draft. The initial RX Eye Opening value is set to 0.7 UI, but it must get smaller after study. Further discussion described the eye opening as 0.3 UI, with 0.7 UI as the eye closure. ***The eye opening specification is an open issue.***

- Random and deterministic jitter were deleted from the transmitter part of the spec.. It was felt the Eye Opening incorporated such effects.

- Comments from Dan Schwartz and Dan Brown resulted in the removal of the crosstalk specification. Removal was based on the fact that optical crosstalk is not frequently seen and the value was not meant to reflect electrical crosstalk.

- A suggestion by Steve Joiner was made and accepted to clarify the meaning of interchannel skew relative to the transmitter and receiver. Document labeling was so modified. The 5 ns receiver interchannel skew parameter was considered as more than generous.

- Steve Joiner led a discussion on how to define fiber bandwidth in the document. The 200 MHz • km value is not supported by many fiber makers with standard product, yet this number is met or exceeded in common practice. Ideas ranging from substituting a fixed link BW to using a mode-restricted "effective BW were offered, but no consensus was reached to change the spec. ***Specifying the fiber bandwidth is an open issue.***

- A data point on total connector loss was offered by Dan Brown based on data from US Connect. A mean of 0.35 dB and standard deviation of 0.1 dB led to an allowance of 2 dB for 4 connectors.

11.9 Open fiber control (OFC)

Dan Schwartz made a presentation about the need for Open Fiber Control in some applications. A key example dealt with a desire by some to have one link work for both 62.5 and 50 µm fiber while maintaining the proper link budget at the receiver.

A "C" code specification for an OFC state machine should be available from Dan by July 1, 1997. It involves 300 to 500 gate equivalents. For the next meeting, Dan expects to present the error hazard calculation, fixed state machine parameters, and a recommended loss budget with OFC.

Some felt it was too early to make a choice between having, or not having, OFC until working solutions were presented.

Ron Soderstrom of IBM invited dialog on the acceptability of an IEC Class 3a laser safety classification for HIPPI-6400 links. IBM and SGI stated Class 1 was preferred in order to reach the broadest possible market. It was suggested that other companies go back to poll their organization as well to get a better read on this issue.

Greg Chesson asked if there was a solution to permit connection of 12 fiber ribbon cables to 144 fiber building cables. No stated answers were received.

11.10 Review document boiler-plate

Don Tolmie has an action item to draft the boiler-plate sections of the HIPPI-6400-OPT document. Unfortunately, he was not able to complete this before the meeting. This item will be carried over to the next meeting.

11.11 Project proposal status

The Project proposal for HIPPI-6400-OPT was in the most recent T11 mailing, and is on the agenda for a T11 vote the following day.

11.12 Call for patents

Don issued a call for patents necessary to implement HIPPI-6400-OPT (see 12.3 for a full text of the call).

Ron Soderstrom stated that IBM has some original patents on OFC for Fiber Channel use. Their applicability to potential HIPPI-6400 use will be investigated and reported back to this committee.

11.13 Planning for future work

It was agreed the HIPPI Optical group would only meet during plenary weeks for the foreseeable future. The next plenary meeting is scheduled for August 5-6, 1997, in Honolulu. The HIPPI-6400-OPT topic will be discussed on Tuesday, August 5, from 5 PM to 9 PM. The agenda will be essentially the same as the agenda for this meeting.

12. Patents

12.1 Hewlett Packard patents

Hewlett-Packard previously supplied a letter defining HP's release of the 4b/5b coding for use in HIPPI-6400, and has been asked to complete the ANSI patent release form. HP is also working on a release for the HIPPI-ST concepts. Francois Gaullier was not at the meeting, but Greg Chesson said that the HIPPI-ST stuff is close to being completed.

Bell Micro Products will be the distributor for the SuMAC chip. The contact is Ron Mabry at (408)451-1613 or ronmabry@msn.com.

12.2 Berg connector patents

Don Tolmie reported that the Berg connector patent release forms have been sent to ANSI.

12.3 Call for other patents

A call was issued for disclosure of the existence of patents required to implement any and all HIPPI standards. It is necessary for the patent holders to agree to license those patents in conformance with the ANSI patent policy if the project on which they apply is to proceed. T11 and the HIPPI group are not involved in this process at all.

The contact at ANSI is the General Counsel, Ms. Amy Marasco - (212) 642-4954 or amarasco@ansi.org. A patent policy description is at www.ansi.org/proctbl.html, section 1.2.11.

No new patent claims were made at this meeting.

13. Administrative matters

13.1 T11 reorganization letter ballot status

The T11 reorganization is going forward, with new Task Groups being formed: T11.1 for HIPPI, and T11.2 for Physical Variants. It is expected that other new Task Groups will be formed as time goes on. The organizational meeting for T11.1 will be August 6 in Honolulu. All the companies represented at this meeting can become charter members at this meeting with full voting rights.

Those companies who miss the August meeting and come to future T11.1 plenary meetings (in the even-numbered months) will be required to attend the first one as an Observer with no voting rights. A formal request for membership must then be submitted to the T11.1 chairman (probably Don Tolmie), and then at the second plenary meeting the company will have full voting rights. The procedures for T11, and T11.2 are the same.

13.2 Processing International standards

Don Tolmie reported that our recent requests to ISO JTC1/SC25 for new projects for HIPPI-Serial and HIPPI-ATM were defeated due to not enough countries indicating support. There are currently 15 countries represented and only four pledged support (Brazil, Germany, UK, and USA) when five are required for passage. Interestingly enough, countries that passed included France and Japan, both countries with HIPPI equipment and interest.

Without new projects for these documents, we can still avail ourselves of the "ISO Fast Track" procedure. Here we submit approved ANSI standards, and only one international vote is taken rather than several. It is unsure which way is really faster. One benefit of Fast Track is that essentially the same document is standardized in both the USA and internationally. Otherwise if we follow the normal standards development cycle in both ANSI and ISO, then there is a good chance the documents will diverge due to the public review comments coming back separately from each. We will wait to talk to Gene Milligan, the T11 International Representative, to see how the June JTC1/SC25 meeting went before committing to one path or another.

13.3 T11 web page

Roger Cummings of DPT, T11 Chairman, is setting up a web site for T11. It is close to completion and should be announced soon. It should have the latest HIPPI documents in development and other stuff used in their development. One change we may see is that it will have a password-protected area for finished standards, and this area will be available to paying members of T11 and its Task Groups. When the site is available, the documents that are finished standards will be removed from the web site that Don Tolmie operates. The reason is to avoid copyright issues.

14. Future meeting schedule

14.1 Interim HIPPI-6400 meeting, July 8-10, Minneapolis / St. Paul, MN

This interim meeting will cover HIPPI-6400 and HIPPI-ST issues. The meeting times were set at the May meeting based on flight schedules from/to the major participant's locations. Discussion of copper issues will start at 1 PM on Wednesday, July 9th.

Tuesday, July 8 — 2 PM - 9 PM
Wednesday, July 9 — 8 AM - 9 PM (copper 1 PM)
Thursday, July 10 — 8 AM - 2 PM

The location is the Cray Research facility. Jeff Young and Cray Research are the host. You will receive a visitor's badge to enter the facilities. Lunches and dinners will be provided. A group of rooms at the Hampton Inn in Eagandale has been blocked for this meeting. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details.)

Note that previous announcements called for the meeting to end at 4 PM on Thursday. The ending time has now been moved up to 2 PM to mesh with flight times.

14.2 Plenary week, August 5-6, Honolulu, Hawaii

During the T11 August plenary week , the following HIPPI meetings are scheduled:

Tuesday, Aug 5
9 AM - 5 PM — HIPPI Wkg Group (copper 9 AM)
5 PM - 9 PM — HIPPI-6400 Optical

Wednesday, Aug 6 -
8 AM - 6 PM — HIPPI Working Group
6 PM - 9 PM — T11.1 Plenary (HIPPI)

People who make it to this T11.1 Plenary meeting can become members of T11.1 at the meeting (see item 13.1 above for a more complete membership discussion).

The location is the Ala Moana Hotel, Honolulu, Hawaii. Paul Boulay and Hitachi Computer Products (America) are the host. (See the meeting announcement on the web page at http://www.cic-5.lanl.gov/~det/ for further details. Note that the reservation deadline is July 2.)

14.3 Future meeting dates and locations

The following 1997 T11 plenary week dates are shown below. Recent changes to this list are underlined to make them easier to find. T11 has changed their Plenary day to Thursday starting at the August meeting. With the T11 Plenary move, Don Tolmie was able to move the HIPPI meetings to Tuesday and Wednesday during Plenary week, making it easier for people to attend without having to travel on the weekend. The T11.1 (i.e., HIPPI), Plenary meeting will be on Wednesday evening of the T11 Plenary week, following the HIPPI working meetings.

The difference between the different types of meeting is as follows.

Plenary meetings are the formal meetings of T11 and T11.1. Membership is on a company basis, and requires payment of fees, regular attendance, and responding to letter ballots. The meetings are open to anyone, but only member companies can vote. Any final action taken on document, e.g., forwarding, is done at a Plenary meeting.

Interim and working meetings do not have any fee or attendance requirements, and all companies present can vote.

1997 –

July 8-10	Interim	Minneapolis, MN	Cray
Aug 5-6	Plenary	Honolulu, HI	Hitachi
Sep 9-11	Interim	Mt. View, CA	SGI
Oct 7-8	Plenary	Tucson, AZ	FSI
Nov 4-6	Interim	Albuquerque, NM	LANL
Dec 9-10	Plenary	Orlando, FL	DPT

The 1998 schedule is less firm, but here is what is currently being considered by T11 for the plenary meetings. Question marks note the ones that are open. Hopefully HIPPI-6400 will be far enough along that we will not continue to need interim working meetings; more may be scheduled as we see the need.

1998 –

Jan 13-14	Interim	Mt. View, CA	SGI
Feb 10-11	Plenary	San Diego	Qlogic
Apr 21-22	Plenary	Palm Springs, CA	Brocade
Jun 9-10	Plenary	St. Petersburg Beach, FL	AMP
Aug 11-12	Plenary	??	Hitachi ??
Oct 6-7	Plenary	Ft. Lauderdale, FL	Adaptec
Dec 8-9	Plenary	Tucson ??	FSI ??

15. Review action items

(The action items are grouped by project or category to hopefully make them easier to find.)

1. Everyone to review the HIPPI-800 Switch MIB and pass comments to Marck Doppke.
2. Don Tolmie to make the HIPPI-800 Switch MIB document available in PDF format on the web.
3. Michael McGowen to coordinate the HIPPI MIB developers.
4. Von Welch to contact HIPPI-6400 MIB users and developers for comments on the current draft, and to prepare a presentation on the MIB for a future meeting.
5. Everyone to review the HIPPI-6400 MIB.
6. Kevin Lahey, Jeff Young, Jean-Michel Pittet, and Greg Chesson to begin an IP and ARP over HIPPI-6400 RFC.
7. Greg Chesson to put Jean-Michel Pittet in touch with Phil Cameron of Essential Communications for ARP over HIPPI work.
8. Greg Chesson and Robert Hyerle to get Jean-Michel Pittet and Dennis Roger to start working together on ARP over HIPPI-800.

9. Michael McGowen to pursue having Phil Cameron look at ARP for HIPPI-800.

10. Greg Chesson to contact Bob Snively of Sun about material and format for an IEEE tutorial on HIPPI-6400 ULA usage, and the ULAs special to HIPPI-6400.

11. Michael McGowen - Update HIPPI-AC to work with HIPPI-SC and its recent changes.
12. Don Tolmie to notify Michael McGowen, and the HIPPI e-mail reflector, of our intention to kill the HIPPI-AC project if no forward progress is made by the October 1997 meeting.
13. Everyone to suggest changes to HIPPI-FP and bring in proposals for them.
14. Don Tolmie to revise HIPPI-FP, X3.210-1992, with the ULP-id for HIPPI-6400 encapsulation and get the HIPPI-FP document ready to forward.

15. Greg Chesson and Jeffrey Chung to consider developing "reason codes" to explain why a particular HIPPI-ST Operation was rejected.
16. Greg Chesson to do a first draft of HIPPI-ST over Ethernet.
17. Jim Pinkerton to resolve the use of R_id, S_id, B_id and their use in Request_To_Receive.
18. Don Tolmie to update HIPPI-ST Rev 0.7 with the changes agreed to at the June meeting.

19. Roger Ronald to include the OUI mapping information in HIPPI-6400-SC.
20. Roger Ronald to investigate specifying using either full 48-bit ULA addressing, or a subset selected by the "locally administered" bit, and provide appropriate text for HIPPI-6400-SC.
21. Roger Ronald and Craig Davidson to include the address mapping between HIPPI-800 and HIPPI-6400 in future revisions of HIPPI-6400-SC.
22. Don Tolmie to have an ANSI Style Manual sent to Roger Ronald.
23. Roger Ronald to update HIPPI-6400-SC Rev 1.2 with the changes agreed to at the June meeting.

24. Hansel Collins to draft text to replace -PH table 8, which gave the values for the cable coupling network.
25. Hansel Collins to finish the cable driver test jig, test cable system, and determine the Source driver's output impedance.
26. Hansel Collins and Steve Joiner to determine the values to replace the 'TBDs' in the copper clauses of HIPPI-6400-PH.
27. Hansel Collins and Steve Joiner to draft definitions of pulse width distortion and jitter for use in HIPPI-6400-PH.
28. Hansel Collins to provide an eye mask diagram for the copper cable variant.
29. Herb Van Deusen to investigate using Gore's Eye-Opener cable.
30. Michael McGowen to collect and tabulate everyone's requirements for HIPPI-800 and HIPPI-6400 translation environments.
31. Don Tolmie to update HIPPI-6400-PH Rev 1.4 with the changes agreed to at the May meeting.

32. Hansel Collins, Steve Joiner, and Dan Schwartz to come up with a pulse width distortion number for HIPPI-6400-PH table 9, or something equivalent, e.g., jitter.
33. Don Tolmie to do an initial draft of HIPPI-6400-OPT.
34. Dan Brown to update the optical parameter table with the values agreed to at the June meeting.

15. Adjournment

The meeting adjourned at 9:50 PM on June 6.

Notes from June T11 Plenary

The T11 Plenary met the next day, i.e., June 11. HIPPI related items are reported here for your convenience, the definitive record is the T11 minutes.

The NCITS letter ballot to create Task Groups T11.1 (HIPPI) and T11.2 (Physical Variants) closes June 30. The plan is to announce the organizational meeting for T11.1 by July 4.

A vote to forward the Project Proposal for HIPPI-6400-OPT passed by a roll-call vote of 58 For, 0 Opposed, and 26 not voting. T11 will forward the Project Proposal to OMC for further processing. The NCITS letter ballot on the HIPPI-ST Project Proposal closes July 14 (no problems are expected).

The T11 web site address is http://www.dpt.com/t11, and its FTP site is ftp://ftp.dpt.com/t11. Check it out. The www.cic-5.lanl.gov/~det/ site will remain as the primary site for HIPPI standards activities, and the T11 site will be a backup, and location for T11 specific items. For your information, the T10 (SCSI) web site is at http://www.symbios.com/t10/.

At the last meeting it was reported that HIPPI-ATM and HIPPI-Serial failed to achieve the necessary support in ISO, and have been dropped as new projects. NCITS is in the process of submitting the newly approved ANSI standards for HIPPI-ATM and HIPPI-Serial to the ISO Fast-Track process. ISO comments were received against HIPPI-ATM, HIPPI-Serial, and FC-FP, and will be considered when generating the ISO versions of these documents.

The "T11 Liaison with Industry Groups" proposal was approved as an official T11 policy.

A new cover sheet for our working documents has been generated by Roger Cummings – it includes a copyright statement.

NOTE – The IEEE has assigned OUI 00-10-3B to the HNF for use with HIPPI-6400. A tutorial at http://standards.ieee.org/db/oui/tutorials/lanman.html explains how to use this identifier in 48-bit addresses.

Attendance

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